



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,386	03/15/2004	Tongbi Jiang	500180.03 (29249/US/2)	3160

7590 03/31/2006

Mark W. Roberts, Ph.D., Esq.  
DORSEY & WHITNEY LLP  
Suite 3400  
1420 Fifth Avenue  
Seattle, WA 98101

EXAMINER
----------

LOUIE, WAI SING

ART UNIT	PAPER NUMBER
----------	--------------

2814

DATE MAILED: 03/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/801,386	<b>Applicant(s)</b> JIANG, TONGBI	
	<b>Examiner</b> Wai-Sing Louie	<b>Art Unit</b> 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 34-37 and 42-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 34-37 and 42-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 34 is rejected under 35 U.S.C. 102(b) as being anticipated by Sachdev et al. (US 5,700,581).

With regard to claim 34, Sachdev et al. disclose a epoxy based adhesive for semiconductor chip attachment (col. 2, line 39 et seq.), comprising:

- A semiconductor chip (col. 8, line 19);
- A substrate to which the semiconductor chip is attached (col. 8, line 19);
- Adhesive die attach material disposed between the semiconductor die and the substrate, the adhesive die attach material directly abutting the substrate and the semiconductor die (col. 8, lines 19-20), a die attach bondline at the interface between the adhesive die attach material and the semiconductor die being substantially void free (col. 6, lines 23-28).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 35-37 and 43-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sachdev et al. (US 5,700,581) in view of Conru et al. (US 5,086,018).

With regard to claims 35 and 43, Sachdev et al. disclose the adhesive die attach material is available in paste and tape versions (col. 1, lines 37-41), but do not disclose the material comprises a tri-layer attach tape. However, Conru et al. disclose a tri-layer adhesive tape 11 used to attach a semiconductor chip 12 to the substrate 18 (Conru col. 3, lines 15-32 and fig. 3). Conru et al. teach the tri-layer tape helps assure that short circuits between the lead frame and the chip do not occur (Conru col. 3, lines 18-20). Therefore, it would have been obvious to one of ordinary skill in the art to modify Sachdev's device with the teaching of Conru et al. to provide a tri-layer die attach tape in order to assure that short circuits between the lead frame and the chip do not occur.

With regard to claims 36 and 44, Sachdev et al. modified by Conru et al. disclose a lead frame 14 disposed between the semiconductor chip 12 and the substrate 18 (Conru fig. 3).

With regard to claims 37 and 45, Sachdev et al. disclose the adhesive die attach material is conductive adhesive (col. 9, lines 39-40) and therefore, Sachdev et al. modified by Conru et al. in claim 36 above, the semiconductor chip 12 would be electrically coupled to the conductive trace 14 formed on the surface of the substrate 18 through conductive bond wires 16 (Conru fig. 3).

Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sachdev et al. (US 5,700,581) modified by Conru et al. (US 5,086,018) as applied to claim 35 above, and further in view of Desai et al. (US 6,266,249).

With regard to claim 42, in addition to the limitations disclosed in claim 34 above, Sachdev et al. modified by Conru et al. also disclose:

- A pressure and heat cured adhesive die attach material disposed between the semiconductor chip and the first surface of the substrate being substantially void free (col. 8, lines 19-27);
- A plurality of bond pads 53 disposed on the semiconductor die 52, the bond pads 53 being electrically coupled to a corresponding plurality of conductive leads 51 on the second surface of the substrate 57 by the bond wire 54 (Conru fig. 5).

Sachdev et al. modified by Conru et al. do not disclose the aperture on substrate 57 and where the bond pads aligned with and bond wires passing through.

However, Desai et al. disclose through holes 18 on the substrate 22, where the semiconductor device 30 aligned the through holes 18 (Desai col. 3, lines 51-64) and conductive traces 24 are electrically coupled the via 18 by solder (Desai col. 3, lines 40-49). Desai teaches the IC device can be miniaturized by stacking the devices and connecting with through holes (Desai col. 1, lines 18-22 and lines 39-43). Therefore, it would have been obvious to one of ordinary skill in the art to modify Sachdev's device with the teaching of Conru et al. and Desai et al. to

provide a substrate with apertures in order to stack the devices and connect with through holes.

***Response to Arguments***

Applicant's arguments with respect to claims 34-37 and 42-45 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (571) 272-1709. The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Wai-Sing Louie  
Patent Examiner

Wsl  
March 29, 2006.